

ABSTRACT

Most of the buildings in Indonesia use concrete as their foundation. Voids, namely damage to the concrete in the form of holes with wide dimensions and deep enough. If left unused will damage the structural structural concrete and will cause other damage such as corrosive to reinforcing concrete. Because the damage inside the concrete cannot be seen clearly, it is necessary to use a system to help check. Ground Penetrating Radar (GPR) is a radar system to detect objects under the surface of objects.

In the final project, a test was made to detect voids in concrete through simulation and experimentation. The simulation uses GPRMax software while the experiment models the GPR method using the Vector Network Analyzer as GPR modeling. The type of concrete used in testing is concrete that has been modeled so that it has voids in it. At the signal processing stage, the simulation results are carried out signal processing up to the B-Scan (2-dimensional shape), while for the experiment the signal processing to C-Scan (3-dimensional form) is conducted.

The results of the Final Project for the A-Scan signal that the position of the object right in the middle between the coordinates of the antenna Tx and Rx produces greater voltage but requires a longer time when compared to the object by placing the object directly under one of the Tx or Rx antennas. For the results of the B-Scan signal, the depth (of the y-axis) of the three B-Scan output signal experiments with accuracy of the object reflection time is 94,11%, for the accuracy of the position of the object (with respect to the x-axis) for scenarios 1 and 3 is 100%. Experiments have started to be seen but it is not very clear to reconstruct the B-Scan signal because the samples taken at the time of measurement are too few so the detection results are not very clear.

Keywords : Concrete, Voids, Ground Penetrating Radar (GPR), Vector Network Analyzer (VNA), Signal Reconstruction.